

Review— Naming Chemical Compounds

The following are a good mix of naming and formula writing problems to help you get some practice. I will expect that you know how to name both ionic and covalent compounds in your work.

Name the following chemical compounds:

- 1) NaBr Sodium bromide
- 2) $\text{Ca}(\text{C}_2\text{H}_3\text{O}_2)_2$ calcium acetate
- 3) P_2O_5 diphosphorus pentoxide
- 4) $\text{Ti}(\text{SO}_4)_2$ titanium (IV) sulfate
- 5) FePO_4 iron (III) phosphate
- 6) K_3N potassium nitride
- 7) SO_2 sulfur dioxide
- 8) CuOH copper (I) hydroxide
- 9) $\text{Zn}(\text{NO}_2)_2$ zinc nitrate
- 10) V_2S_3 vanadium (III) sulfide

Write the formulas for the following chemical compounds:

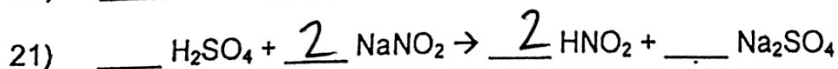
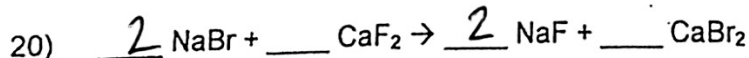
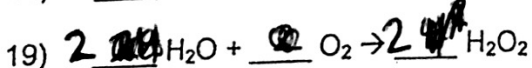
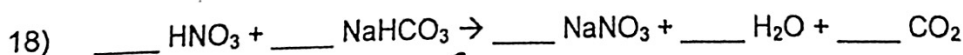
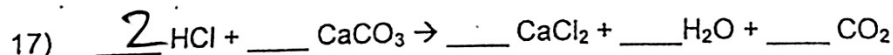
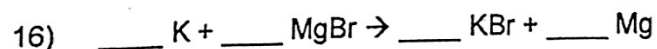
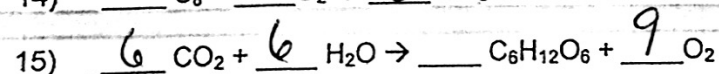
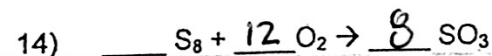
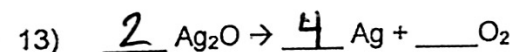
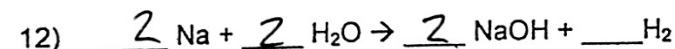
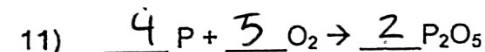
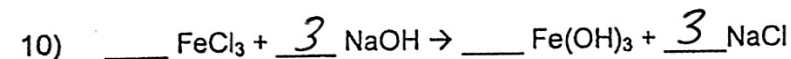
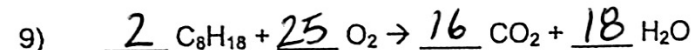
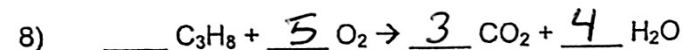
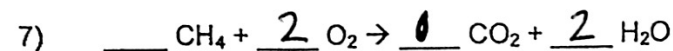
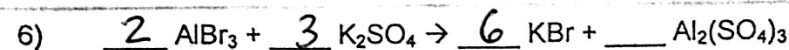
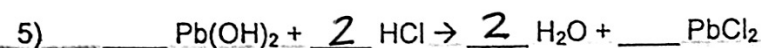
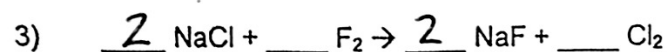
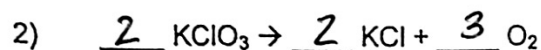
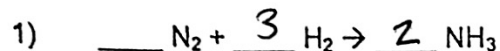
- 11) silicon dioxide SiO_2
- 12) nickel (III) sulfide Ni_2S_3
- 13) manganese (II) phosphate $\text{Mn}_3(\text{PO}_4)_2$
- 14) silver acetate $\text{AgC}_2\text{H}_3\text{O}_2$
- 15) diboron tetrabromide B_2Br_4
- 16) magnesium sulfate heptahydrate $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$
- 17) potassium carbonate K_2CO_3
- 18) ammonium oxide $(\text{NH}_4)_2\text{O}$
- 19) tin (IV) selenide SnSe_2
- 20) carbon tetrachloride CCl_4

Balancing Chemical Equations Worksheet

1. $\underline{2} \text{H}_2 + \underline{\quad} \text{O}_2 \rightarrow \underline{2} \text{H}_2\text{O}$
2. $\underline{\quad} \text{N}_2 + \underline{3} \text{H}_2 \rightarrow \underline{2} \text{NH}_3$
3. $\underline{\quad} \text{S}_8 + \underline{12} \text{O}_2 \rightarrow \underline{8} \text{SO}_3$
4. $\underline{2} \text{N}_2 + \underline{\quad} \text{O}_2 \rightarrow \underline{2} \text{N}_2\text{O}$
5. $\underline{2} \text{HgO} \rightarrow \underline{2} \text{Hg} + \underline{\quad} \text{O}_2$
6. $\underline{6} \text{CO}_2 + \underline{6} \text{H}_2\text{O} \rightarrow \underline{\quad} \text{C}_6\text{H}_{12}\text{O}_6 + \underline{9} \text{O}_2$
7. $\underline{\quad} \text{Zn} + \underline{2} \text{HCl} \rightarrow \underline{\quad} \text{ZnCl}_2 + \underline{\quad} \text{H}_2$
8. $\underline{\quad} \text{SiCl}_4 + \underline{4} \text{H}_2\text{O} \rightarrow \underline{\quad} \text{H}_4\text{SiO}_4 + \underline{4} \text{HCl}$
9. $\underline{2} \text{Na} + \underline{2} \text{H}_2\text{O} \rightarrow \underline{2} \text{NaOH} + \underline{\quad} \text{H}_2$
10. $\underline{2} \text{H}_3\text{PO}_4 \rightarrow \underline{\quad} \text{H}_4\text{P}_2\text{O}_7 + \underline{\quad} \text{H}_2\text{O}$
11. $\underline{\quad} \text{C}_{10}\text{H}_{16} + \underline{4} \text{Cl}_2 \rightarrow \underline{10} \text{C} + \underline{8} \text{HCl}$
12. $\underline{\quad} \text{CO}_2 + \underline{2} \text{NH}_3 \rightarrow \underline{\quad} \text{OC}(\text{NH}_2)_2 + \underline{\quad} \text{H}_2\text{O}$
13. $\underline{4} \text{Si}_2\text{H}_3 + \underline{17} \text{O}_2 \rightarrow \underline{8} \text{SiO}_2 + \underline{6} \text{H}_2\text{O}_3$
14. $\underline{2} \text{Al}(\text{OH})_3 + \underline{3} \text{H}_2\text{SO}_4 \rightarrow \underline{\quad} \text{Al}_2(\text{SO}_4)_3 + \underline{6} \text{H}_2\text{O}$
15. $\underline{4} \text{Fe} + \underline{3} \text{O}_2 \rightarrow \underline{2} \text{Fe}_2\text{O}_3$
16. $\underline{\quad} \text{Fe}_2(\text{SO}_4)_3 + \underline{6} \text{KOH} \rightarrow \underline{3} \text{K}_2\text{SO}_4 + \underline{2} \text{Fe}(\text{OH})_3$
17. $\underline{2} \text{C}_7\text{H}_6\text{O}_2 + \underline{15} \text{O}_2 \rightarrow \underline{14} \text{CO}_2 + \underline{6} \text{H}_2\text{O}$
18. $\underline{\quad} \text{H}_2\text{SO}_4 + \underline{8} \text{HI} \rightarrow \underline{\quad} \text{H}_2\text{S} + \underline{4} \text{I}_2 + \underline{4} \text{H}_2\text{O}$
19. $\underline{4} \text{FeS}_2 + \underline{11} \text{O}_2 \rightarrow \underline{2} \text{Fe}_2\text{O}_3 + \underline{8} \text{SO}_2$
20. $\underline{2} \text{Al} + \underline{3} \text{FeO} \rightarrow \underline{\quad} \text{Al}_2\text{O}_3 + \underline{3} \text{Fe}$
21. $\underline{\quad} \text{Fe}_2\text{O}_3 + \underline{3} \text{H}_2 \rightarrow \underline{2} \text{Fe} + \underline{3} \text{H}_2\text{O}$
22. $\underline{\quad} \text{Na}_2\text{CO}_3 + \underline{2} \text{HCl} \rightarrow \underline{2} \text{NaCl} + \underline{\quad} \text{H}_2\text{O} + \underline{\quad} \text{CO}_2$
23. $\underline{2} \text{K} + \underline{\quad} \text{Br}_2 \rightarrow \underline{2} \text{KBr}$
24. $\underline{\quad} \text{C}_7\text{H}_{16} + \underline{11} \text{O}_2 \rightarrow \underline{7} \text{CO}_2 + \underline{8} \text{H}_2\text{O}$
25. $\underline{\quad} \text{P}_4 + \underline{5} \text{O}_2 \rightarrow \underline{2} \text{P}_2\text{O}_5$

Balancing Chemical Equations

Balance the equations below:



Date: _____

Name: _____

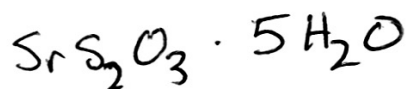
Formula of a Hydrate worksheet

Section 6.2: p 277

1. A 3.34 g sample of a hydrate, $\text{SrS}_2\text{O}_3 \cdot x\text{H}_2\text{O}_{(s)}$, contains 2.30 g of $\text{SrS}_2\text{O}_{3(s)}$. Find the value of x.

$$2.30 \text{ g } \text{SrS}_2\text{O}_3 \div 199.74 = .012 \div .012 = 1$$

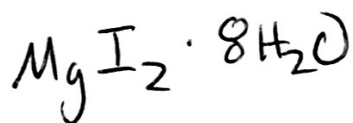
$$1.04 \text{ g } \text{H}_2\text{O} \div 18.02 \text{ g/mol} = .058 \div .012 = 5$$



2. The mass of a sample of a hydrate of magnesium iodide is 1.628 g. It is heated until it is anhydrous and its mass is 1.072 g. Determine the formula for the hydrate.

$$1.072 \text{ g } \text{MgI}_2 \div 278.11 = .0039 \div .0039 = 1$$

$$.556 \text{ g } \text{H}_2\text{O} \div 18.02 = .031 \div .0039 = 8$$



Looking Back:

3. A sample of rubbing alcohol solution contains ethanol, $\text{C}_2\text{H}_5\text{OH}_{(l)}$. If the sample contains 1.25×10^{23} atoms of hydrogen in the ethanol, what amount of moles of ethanol is in the sample?

$$1.25 \times 10^{23} \text{ atoms} \div (6.02 \times 10^{23}) = .208 \text{ mol } \text{C}_2\text{H}_5\text{OH}$$

4. Calculate the amount in moles of trinitrotoluene, $C_7H_5(NO_2)_3(s)$, an explosive, in $3.45 \times 10^{-3} g$.

$$3.45 \times 10^{-3} g \div 227.13 = 1.52 \times 10^{-5} mol$$

5. What is the mass, in grams, of a single atom of platinum?

$$1 atom \div (6.02 \times 10^{23}) \times 195.08 g = 3.24 \times 10^{-22} g$$

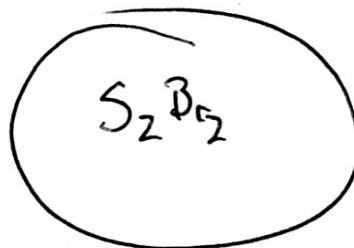
6. Chemical analysis indicates that a compound is 28.64% sulfur and 71.36% bromine. The molar mass of the compound is 223.94 g/mol. Determine the molecular formula.

$$28.64 g \div 32.07 = .89 \div .89 = 1$$

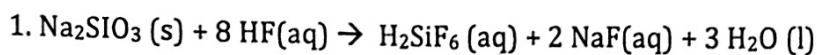
$$71.36 \div 79.90 = .89 \div .89 = 1$$

$$\begin{array}{r} SBr - 32.07 \\ 79.90 \\ \hline 111.97 \end{array}$$

$$\frac{223.94}{111.97} = 2$$



Stoichiometry Worksheet



a. How many moles of HF are needed to react with 0.300 mol of Na_2SiO_3 ?

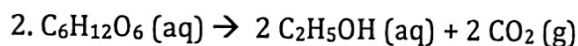
$$\frac{0.300 \text{ mol}}{1 \text{ mol}} \times \frac{8 \text{ mol}}{1 \text{ mol}} = 2.4 \text{ mol HF}$$

b. How many grams of NaF form when 0.500 mol of HF reacts with excess Na_2SiO_3 ?

$$\frac{0.500 \text{ mol}}{8 \text{ mol HF}} \times \frac{2 \text{ mol NaF}}{1 \text{ mol HF}} \times \frac{41.99 \text{ g}}{1 \text{ mol NaF}} = 5.25 \text{ g NaF}$$

c. How many grams of Na_2SiO_3 can react with 0.800 g of HF?

$$\frac{0.800 \text{ g HF}}{20.01 \text{ g HF}} \times \frac{1 \text{ mol}}{8 \text{ mol}} \times \frac{1 \text{ mol}}{1 \text{ mol}} \times \frac{122.07 \text{ g}}{1 \text{ mol}} = 0.610 \text{ g}$$



a. How many moles of CO_2 are produced when 0.400 mol of $\text{C}_6\text{H}_{12}\text{O}_6$ reacts in this fashion?

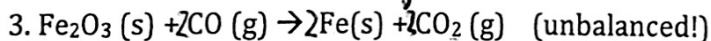
$$\frac{0.400 \text{ mol}}{1 \text{ mol}} \times \frac{2 \text{ mol}}{1 \text{ mol}} = 0.800 \text{ mol CO}_2$$

b. How many grams of $\text{C}_6\text{H}_{12}\text{O}_6$ are needed to form 7.50 g of $\text{C}_2\text{H}_5\text{OH}$?

$$\frac{7.50 \text{ g}}{46.08 \text{ g}} \times \frac{1 \text{ mol}}{2 \text{ mol}} \times \frac{1 \text{ mol}}{1 \text{ mol}} \times \frac{180.18 \text{ g}}{1 \text{ mol}} = 14.7 \text{ g}$$

c. How many grams of CO_2 form when 7.50 g of $\text{C}_2\text{H}_5\text{OH}$ are produced?

$$\frac{7.50 \text{ g}}{46.08 \text{ g}} \times \frac{1 \text{ mol}}{2 \text{ mol}} \times \frac{2 \text{ mol}}{1 \text{ mol}} \times \frac{44.01 \text{ g}}{1 \text{ mol}} = 7.16 \text{ g}$$



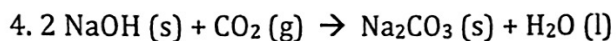
a. Calculate the number of grams of CO that can react with 0.150 kg of Fe_2O_3

$$\frac{150 \text{ g}}{159.7 \text{ g}} \times \frac{1 \text{ mol}}{1 \text{ mol}} \times \frac{2 \text{ mol}}{2 \text{ mol}} \times \frac{28.01 \text{ g CO}}{1 \text{ mol}} = 52.6 \text{ g CO}$$

b. Calculate the number of grams of Fe and the number of grams of CO_2 formed when 0.150 kg of Fe_2O_3 reacts

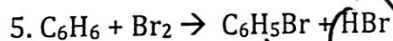
$$\begin{array}{c|c|c|c} 150\text{g} & 1\text{mol} & 2\text{mol} & 55.85\text{g} \\ \hline & 159.7\text{g} & 1\text{mol} & 1\text{mol} \end{array} = 105\text{g Fe}$$

$$\begin{array}{c|c|c|c} 150\text{g} & 1 & 2 & 44.01 \\ \hline & 159.7 & 1 & \end{array} = 82.7\text{g CO}_2$$



a. Which reagent is the limiting reactant when 1.85 mol NaOH and 1.00 mol CO_2 are allowed to react?

b. How many moles of Na_2CO_3 can be produced?



a. What is the theoretical yield of $\text{C}_6\text{H}_5\text{Br}$ in this reaction when 30.0 g of C_6H_6 reacts with 65.0 g of Br_2 ?

b. If the actual yield of $\text{C}_6\text{H}_5\text{Br}$ was 56.7 g, what is the percent yield?